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ALCOA ALUMINUM IN ARCHITECTURE

finishes

alloys

specifications

patterned sheet

Myers

ARCHITECTURAL ADVANTAGES OF ALUMINUM

Corrosion resistance—Aluminum is highly resistant to weather and to corrosive industrial and seacoast atmospheres. Although exposure creates surface oxidation and dulling, the metal is not weakened structurally. The oxide formed builds itself up as an added protective coating so that the weathering rate soon tends to level off. The average penetration of weathering on architectural alloys is not much deeper after a half century than after two years. Exposure in a typical industrial atmosphere produces pitting to an average depth of only 3 mils in the aluminum after 52 years. Thus, a sheet .032" thick would still retain 29 mils of sound metal. Corrosion resistance can be further increased by Alumilite* or Alcoa Architectural Color finishes.

Light weight—Aluminum weighs about one-third as much as equal volumes of other common building metals. This brings substantial economies through reductions in dead load, in shipping costs, in size of erection crews and in installation time.

High strength—While the most common architectural alloys have ultimate tensile strengths in the range of 22,000 psi, others with strengths up to 68,000 psi are available.

High electrical conductivity—The conductivity of aluminum alloy EC (electrical conductor) is 61% International Annealed Copper Standards. The current-carrying capacity is 84% that of a similar volume of copper. By increasing the volume of aluminum, its conductivity can be made to equal that of copper, yet do so with about half the weight and for lower cost—ideal features for electrical distribution systems.

High heat conductivity—When rapid thermal conduction is a requirement, aluminum is, pound for pound, the most efficient conductor among common metals.

High reflectivity of light and radiant heat—The natural surface of aluminum is highly reflective to both light and radiant energy in the invisible wave lengths—a characteristic which can be used to turn back unwanted sun heat from buildings. Special surface treatments can boost aluminum's light reflectivity to 90% of the incident visible rays, making the metal a desirable component in lighting fixtures.

Versatility—The various forms in which aluminum is commercially produced and its receptivity to embossing and finishing make it adaptable to every architectural design requirement. Aluminum's easy "workability," along with the use of common fabricating methods and new welding techniques, extend this versatility to the fabricator and the erector.

Nonsparking—There are no inherent sparking characteristics in aluminum to present explosion hazards.

Fine appearance—The natural mill finish of aluminum is suitable for many architectural uses without further surface preparation. A variety of texture and color finishes may be readily applied for decorative purposes.

Low maintenance—Aluminum needs no painting or other protective coatings. While occasional washings remove accumulated dirt and renew the appearance, even this is not necessary to maintain structural integrity. Where a continued bright appearance is desired, an Alumilite finish will make maintenance easier. Where outside surfaces are not to be maintained, an Alcoa Architectural Color finish should give lasting beauty.

GENERAL ARCHITECTURAL FINISHES

unfinished

Mill or As-fabricated Finish—The surface which naturally results from extrusion, rolling, casting or other metal processing practice. It will vary somewhat for different alloys and tempers. Such surfaces are not unpleasant; and subsequent weathering grays the metal uniformly.

texture finishes[†]

Various surface qualities from smooth to rough are created on aluminum by mechanical and chemical means. These effects may be used as the final surface of the metal or as pretreatments before additional finishes such as Alumilite. TEXTURE FINISHES should be protected against handling marks by a protective coating. (See CONSTRUCTION PROTECTION.)

Bright or Buffed Finish—A smooth, highly lustrous finish produced by muslin buffering wheels and sometimes by hand operations. Buffering is usually considered too costly and difficult to apply on large areas, but is suitable for narrow elements when a high gloss finish is desired.

Polished and buffed.....A1
Buffed direct.....A2

Satin Finishes—A soft texture of fine parallel scratch lines produced in varying degrees of fineness by abrasive methods. It is not recommended for large flat areas due to the difficulty of obtaining a uniform appearance, but works well on store fronts, windows, mullions or trim.

Centerless belt polish, 180 emery (for tube).....B
Belt polish, 180-220 emery.....C1
Hand rubbed, steel wool.....C2
Compound or brush back sander
(such as Vonnegut wheel).....C3
Belt polish, 160-180 emery.....D
Belt polish, 120-140 emery.....E

Sandblast Finish—A rough texture produced by compressed air and washed silica sand in various grades of coarseness. It should be protected by an Alumilite coating or lacquer. Sandblasting is recommended for castings.

Fine blast, 100 to 200 mesh.....G2
Medium blast, 40 to 50 mesh.....G3
Coarse blast, 16 to 20 mesh.....G4

Sand Burnish Finish—A uniform, matte surface created by loose sand, gravel, steel balls and an agitating process. It is particularly suited to castings or flat sheet.....N

Caustic Etch or Frosted Finish—A low-cost, chemically produced matte surface with the appearance of finely etched glass. It is appropriate for windows, mullions and large sheet areas such as wall panels. Since etching can produce surfaces that vary in appearance, architects should request samples from the fabricator. Etched surfaces are especially subject to handling marks and should receive a lacquer coating of Alumilite finish immediately following etching.....R1

* Trade Name of Aluminum Company of America

[†]See also Patterned Sheet, page 7.

Alumilite finish Hard oxide coating formed on aluminum by an electrolytic treatment. Suitable for interior or maintained exterior surfaces, an Alumilite finish provides a highly corrosion-resistant surface, resists dirt accumulation and retains the original appearance of the metal.

When applied according to Alcoa's recommendations, an Alumilite finish increases aluminum's resistance to abrasion and weather to a remarkable degree. The photomicrographs show results of a typical 10-year weathering test conducted at the oceanside near Point Judith, R.I., with pieces of bare aluminum and similar pieces having an Alumilite treatment. While the bare aluminum is still in excellent condition, it displays some shallow weather "pitting." The Alumilite-treated specimen, on the other hand, is virtually as good as new.

Because it is one of the smoothest surfaces available on any architectural metal, an Alumilite finish gives little foothold for dirt and cleans easily when desired. It is recommended for storefronts, doors, windows, trim, canopies, handrails, interior wall fascia—any element where a continued new-looking appearance is wanted and where maintenance will be provided. (NOTE: For a similar looking natural color aluminum finish on exterior unmaintained surfaces, such as curtain walls, Alcoa Architectural Gray 2010 should be specified.)

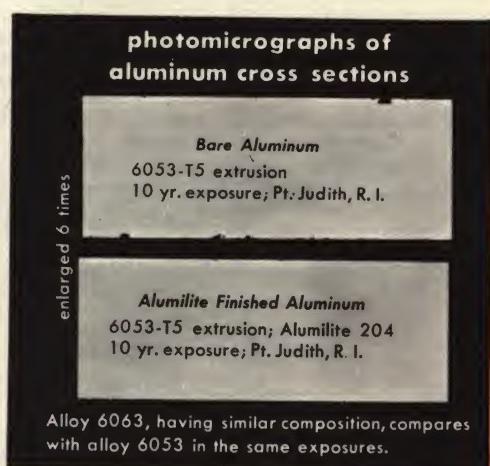
The appearance of an Alumilite finish may vary, depending upon the type of coating, the alloy on which it is formed and

the surface pretreatment. Generally, No. 32 Alumilite Sheet, 6063 extrusion alloy and cast alloy F214 will match each other in appearance after comparable Alumilite treatments. Whenever possible, these are the alloys that should be specified when Alumilite finishes are to be employed and when a matching appearance is important. Where strength requirements dictate the use of other alloys, Alcoa will gladly assist in selecting treatments to secure the next best appearance match between components. (See also GUIDE FOR ALLOY SELECTION, page 4.)

To assure a proper finish, the Alumilite treatment number, coating weight and thickness should be specified following the table. When Alumilite is to be applied to one of the texture finishes, as it usually is, specify the appropriate texture or pretreatment symbol (see TEXTURE FINISHES) after the required Alumilite number.

Specification Example: (for Alumilite over a fine belt-polished satin texture on an extruded handrail subject to maximum abrasion)—*Aluminum handrail shall have Alumilite 215C1 treatment with a minimum coating thickness of .0008" and a minimum coating weight of 35 milligrams per square inch.*

Where Alumilite-treated surfaces are subject to stains and minor abrasions during construction, a protective coating is recommended. (See CONSTRUCTION PROTECTION.)



APPLICATION	SHEET AND EXTRUSIONS			CASTINGS		
	ALUMILITE TREATMENT	MINIMUM COATING THICKNESS	MINIMUM COATING WT. PER SQ IN.	ALUMILITE TREATMENT	MINIMUM COATING THICKNESS	MINIMUM COATING WT. PER SQ IN.
INTERIOR USE						
Minimum Abrasion—(such as picture molds, interior fascia, balusters)	202	.00025"	12 mg	702	.00025"	12 mg
Medium Abrasion—(such as door frames, baseboards, window stools, hardware)	204	.0004"	17 mg	704	.0004"	17 mg
Maximum Abrasion—(such as handrails)	215	.0008"	35 mg	714	.0006"	28 mg
EXTERIOR USE						
Maintained—(such as storefronts, entrance trim)	204	.0004"	17 mg	704	.0004"	17 mg
Maximum Abrasion—(such as maintained handrails)	215	.0008"	35 mg	714	.0006"	28 mg

Alcoa Duranodic finish Exceptionally hard anodic coatings available in light, medium and dark shades of brownish-gray. They are suited for 6063 extrusions that will be subject to much abrasion, such as in entrances, storefronts, railings; also used for curtain walls.†

Alcoa* Alumalure Durable baked enamel finish available in eleven attractive colors on industrial corrugated, ribbed and V-beam building sheets and on flat sheet stock.

Chemical conversion coatings Chemically produced finishes which combine with the aluminum surface and are available in shades of pale green, green-gray, yellow-green, tan. These are low-cost roofing finishes also used as a base for paint. Sources for chemical conversion coatings:

Alcoa Alrok*—various processors; *Architectural Alodine*—Amchem Co.; *Bonderite*—Parker Rust Proof Co.

Alcoa Architectural Color Electrochemically formed finish for curtain walls.†

Porcelain enamel Vitreous enamel coating well suited for exterior application.†

*Trademarks of Aluminum Company of America.

†See Alcoa insert under "Curtain Walls," SWEET'S ARCHITECTURAL FILE, 1960

CONSTRUCTION PROTECTION

A temporary protective coating is recommended for all texture finishes and Alumilite finishes on aluminum items where appearance is important. It provides protection during construction against mortar stains, minor abrasions, etc. One of the most-used protective coatings is a methacrylate-type lacquer, because it is clear and wears off unnoticed over a period of years. For other means of protection refer to the booklet, *Alcoa Architectural Aluminum—Care During Construction*, AIA File No. 15-J, latest edition.

Lacquer Specification: *Apply two sprayed coats of water-white methacrylate lacquer having a total minimum thickness of .0006", which when applied to the aluminum surface shall be capable of withstanding the action of lime mortar for a period of at least one week in an atmosphere of 100% relative humidity at 100° F, the action of 10% (by weight) muriatic acid for a period of six hours at 70° F, and the action of atmospheric weathering for a period of 12 months. The coating shall be applied in the manufacturer's plant to the exposed surfaces of all (specify which) components subject to staining from alkaline mortar and plaster, abrasion and other construction abuses. Before application of lacquer, the manufacturer shall remove all fabrication compounds, moisture, dirt accumulations and other foreign materials to insure proper lacquer adhesion.*

ARCHITECTURAL ALUMINUM ALLOYS

A typical mechanical properties of alloys

ALUMINUM ALLOY NO. (1)	ULTIMATE TENSILE STRENGTH LB PER SQ IN.	YIELD STRENGTH (2) LB PER SQ IN.	SHEAR STRENGTH (3) LB PER SQ IN.
WROUGHT ALLOYS			
1100-H14.....	18,000	17,000	11,000
1135..... -O.....	12,000	4,000	8,000
-H12.....	14,000	13,000	9,000
-H14.....	16,000	15,000	10,000
2024-T4.....	68,000	47,000	41,000
3003-O.....	16,000	6,000	11,000
3003-H14.....	22,000	21,000	14,000
Alclad 3003-H14.....	22,000	21,000	14,000
3004-H34.....	35,000	29,000	18,000
5005-O.....	18,000	6,000	11,000
5005-H12.....	20,000	19,000	14,000
5050-H34.....	28,000	24,000	18,000
5052-H34.....	38,000	31,000	21,000
6061-T4.....	35,000	21,000	24,000
6061-T6.....	45,000	40,000	30,000
6062-T6.....	45,000	40,000	30,000
6063-T4.....	25,000	13,000	16,000
6063-T42.....	22,000	13,000	14,000
6063-T5.....	27,000	21,000	17,000
6063-T6.....	35,000	31,000	22,000
6063-T832.....	42,000	39,000	27,000
No. 32 Alumilite Sheet	-O.....	12,000	4,000
	-H12.....	15,000	14,000
	-H14.....	17,000	16,000
Anoclad Type 10 Sheet	-O.....	12,000	4,000
	-H12.....	15,000	14,000
	-H14.....	17,000	16,000
	-H16.....	19,000	18,000
	-H18.....	22,000	20,000
Anoclad Sheet, Types 20, 30, 40	-O.....	16,000	6,000
	-H11.....	16,000	8,000
	-H12.....	19,000	18,000
	-H14.....	22,000	21,000
No. 1 Porcelain Enameling Sheet—Properties after enameling, without subsequent aging, approach those of 6061-T4. (4)			
No. 3 Porcelain Enameling Sheet—Properties after enameling are similar to those of 3003-O. (4)			
Anoclad Type 10 Extrusions	-T42.....	22,000	13,000
	-T5.....	27,000	21,000
	-T6.....	35,000	31,000
Anoclad Extrusions, Types 20, 30, 40	-T61.....	32,000	25,000
No. 1 Porcelain Enameling Extruded Shapes—Properties after enameling, without subsequent aging, approach those of 6061-T4. (4)			
SAND CASTING ALLOYS			
43-F.....	19,000	8,000	14,000
214-F.....	25,000	12,000	20,000
F214-F.....	21,000	12,000	17,000
356-T6.....	33,000	24,000	26,000

Mechanical properties are obtained on ASTM specimens. Minimum guaranteed values vary with the commodity and are not given.

For all Alcoa alloys, wrought and cast, the following data apply:
 (a) Young's modulus of elasticity may be taken as 10,300,000 lb per sq in.; (b) Modulus of rigidity may be taken as 3,800,000 lb per sq in.; (c) Poisson's ratio is .33; (d) Bearing strength is equal to 1.8 times the tensile strength, provided the edge distance, in the direction of stressing, is not less than twice the diameter of the hole.

- (1) Other tempers from soft to full hard are available offering varying properties.
- (2) Yield strength is the stress at which the material exhibits a permanent set of .2 per cent.
- (3) Shearing strengths are single-shear values obtained from double-shear tests.
- (4) Exact properties after enameling are determined by firing temperature, rate of cooling and aging time, all of which may vary slightly with the enamel processor.

B guide for alloy selection

COMMERCIAL ALUMINUM FORM	GENERAL-PURPOSE ALLOYS		ALLOYS FOR APPEARANCE MATCH
	REGULAR DUTY	HIGHER STRENGTH	
SHEET AND PLATE	1100 3003 Alclad 3003	5050 5052	No. 32 Alumilite Sheet—Appearance match with 6063 extrusions, tube and pipe, and F214 castings after Alumilite treatment. (4) Alcoa Anoclad Sheet Type 10—Appearance match with Alcoa Anoclad Extrusions Type 10 in Alcoa Architectural Colors, 10 series. (1) (4) Alcoa Anoclad Sheet Type 20—Appearance match with Alcoa Anoclad Extrusions Type 20 in Alcoa Architectural Colors, 20 series. (2) (4) Alcoa Anoclad Sheet Type 30—Appearance match with Alcoa Anoclad Extrusions Type 30 in Alcoa Architectural Gray 2030. (4) Alcoa Anoclad Sheet Type 40—Appearance match with Alcoa Anoclad Extrusions Type 40 in Alcoa Architectural Colors, 40 series. (3) (4) Alloy 1135—Appearance match where excessive grinding or mechanical finishing is required before Alumilite treatment. This alloy is subject to mild structural streakage.
EXTRUSIONS	6063	6062	Alcoa No. 1 and No. 3 (5) Porcelain Enameling Sheet—alloys developed for application of porcelain enamel
TUBE AND PIPE	3003 6063 6061		6063—Appearance match with No. 32 Alumilite sheet, 6063 extrusions, F214 castings after Alumilite treatment. Alcoa Anoclad Extrusion Type 10—Appearance match with Alcoa Anoclad Sheet Type 10 in Alcoa Architectural Colors, 10 series. (1) Alcoa Anoclad Extrusion Type 20—Appearance match with Alcoa Anoclad Sheet Type 20 in Alcoa Architectural Colors, 20 series. (2) Alcoa Anoclad Extrusion Type 30—Appearance match with Alcoa Anoclad Sheet Type 30 in Alcoa Architectural Gray 2030. Alcoa Anoclad Extrusion Type 40—Appearance match with Alcoa Anoclad Sheet Type 40 in Alcoa Architectural Colors, 40 series. (3)
SAND CASTINGS	43 356		Alcoa No. 1 Porcelain Enameling Extruded Shapes—alloy developed for application of porcelain enamel
STRUCTURALS	6061 Rolled & Extruded		
FASTENERS	2024 screws 6061 nails 1100 rivets: in 6053 increasing shear 6061 strength		2024—Available with Alumilite finish for extra corrosion resistance. Also available in colors corresponding to Alcoa Architectural Color Finishes.

Most items available in range of strengths from fully annealed to fully hard or fully heat treated. Wide choice of other Alcoa alloys available.

- (1) 10 Series—Alcoa Arch. Gray 2010, Gold 4010.
- (2) 20 Series—Alcoa Arch. Gray 2020, Blue 3120, Brown 4120, Green 6020.
- (3) 40 Series—Alcoa Arch. Gray 2140, Blue 3140, Brown 4040, Green 6040.
- (4) These alloys should not be selected if grinding, belt sanding or other types of mechanical finishing are specified.
- (5) No. 3 should be used only if it meets structural requirements after firing.

SUGGESTED ARCHITECTURAL SPECIFICATIONS

Text at left is for architect's information and is not part of the specification.

To facilitate bidding and accurate quoting, it is recommended that the aluminum components, including anchorage and accessories, be treated under a separate specification division and not combined with miscellaneous metalwork or any other division of work.

specification information

related to the specification at right

1. GENERAL CONDITIONS:

- (a) "The General Conditions of the Contract for the Construction of Buildings," Standard Form of the American Institute of Architects, latest edition, and "Supplementary General Conditions" are the first item of the specification.
- (b) The Supplementary General Condition included here is suggested for use with Alcoa Long Form Specification.

short form specification

Contractor shall furnish and install Alcoa Aluminum (insert product desired) as indicated on the drawings. Workmanship and installation shall be in accordance with recommended standards of Aluminum Company of America.

long form specification

- (a) "The General Conditions of the Contract for the Construction of Buildings," Standard Form of American Institute of Architects, latest edition, Articles 1 to 44 inclusive, are part of this contract.
- (b) These Specifications are "streamlined" and include incomplete sentences. Omitted words or phrases such as, "The Contractor shall," "as noted on the Drawings," "according to the plans," "a," "an," "the," and "all" shall be supplied by inference in the same manner as they are when a "note" occurs on Drawings.

2. WORK INCLUDED:

This should list an outline of all work necessary to make a proper installation of the aluminum product being used. The list should include the following:

- Identification of aluminum product being used by name.
- Miscellaneous parts and fasteners being used for installation of aluminum product.
- Necessary calking.
- Priming and back painting.
- Shop drawings.

- Furnish labor, materials and equipment to complete aluminum (insert product name) work indicated on drawings or specified herein.
- Work shall include all parts and accessories for all variations of fabricating techniques required for a complete installation.
- Calking.
- Priming and back painting.
- Shop drawings.

3. MATERIALS:

Explicit identification of the aluminum product is essential. To specify an aluminum product required for particular job conditions, it is necessary to be familiar with the three identifying properties of Alcoa Aluminum products:

1. Alcoa product nomenclature —
 - Product by trade name — Alcoa Industrial Roofing.
 - Product by name and type; i.e., Alcoa #10 Pattern Sheet.
 - Product by name, type and section number; i.e., Alcoa Gravel Stop Type E, Section No. 68755.
2. Alloy and finish characteristics — see Table B — GUIDE FOR SELECTION OF ALLOYS, (page 4) which covers general applications.
3. Physical Properties —
 - Dimensions — tube: outside dimension and wall thickness.
 - Dimensions and weight — structural shapes: by dimensions and weight per lineal foot.
 - Gage — sheet and plate: by thickness in inches.
 - Section elements — structural shapes: by strength requirements.

The specifications for materials are too variable to allow wording of this section. With the aid of specification data in Alcoa product literature or the assistance of your Aluminum Company of America representative you may devise specifications as required.

Materials for products to be finished in an Alcoa Architectural Color must be specified as follows:

The (insert product name) shall be Alcoa Anoclad Sheet or Extrusion (select which) Type 10, 20, 30 or 40 (select which — see Alcoa insert under "Curtain Walls," SWEET'S ARCHITECTURAL FILE, 1960).

4. FINISHES:

The specifications for most aluminum finishes are too variable and must recognize too many individual factors to permit wording of a standard specification here. However, much of the basic

information needed to write a finish specification will be found on page 2. When additional assistance is required, consult your Alcoa representative.

5. WORKMANSHIP, INSTALLATION:

It is essential to cover and allow for proper workmanship and installation. Particular conditions and those of magnitude must be put forth as a method reminder in a legal form as a binding contract. Minimum requirements are that the work shall be made and erected square, plumb, straight and true, designed for adjustment to field variations, accurately fitted with tight joints and intersections, adequately reinforced and anchored in place.

All aluminum work shall be performed in a shop where grade of metalwork is of recognized quality acceptable to the architects. All items shall be installed plumb, straight, square, level and in proper elevation, plane, location and alignment with other work. All work shall be designed for adjustment to field variations, fitted with proper joints and intersections, adequately anchored in place. All workmanship and finishes shall be first class in every particular, strictly in accordance with best practice. All work shall be complete in every detail. Finished work shall be approved by the architect before the job will be accepted.

6. DISSIMILAR MATERIALS:

(a) ALUMINUM TO DISSIMILAR METALS

Where aluminum surfaces come in contact with metals other than stainless steel, zinc, white bronze or small area or other metals compatible with aluminum, keep aluminum surfaces from direct contact with such parts by (1) painting the dissimilar metal with a prime coat of zinc-chromate primer or other suitable primer, followed by one or two coats of aluminum metal-and-masonry paint or other suitable protective coating, excluding those containing lead pigmentation, (2) painting the dissimilar metal with a coating of heavy-bodied bituminous paint, (3) a good quality calking placed between aluminum and dissimilar metal, or (4) a nonabsorptive tape or gasket. Steel anchors and connecting members may be hot-dip galvanized or zinc plated after fabrication.

(b) DRAINAGE FROM DISSIMILAR METALS

Paint dissimilar metals if used in locations where drainage from them passes over aluminum.

(c) ALUMINUM TO MASONRY

Paint aluminum surfaces in contact with lime mortar, concrete, plaster or other masonry materials with alkaline-resistant coatings, such as heavy-bodied bituminous paint or water-white methacrylate lacquer.

(d) 1. ALUMINUM TO WOOD

Aluminum in contact with wood or other absorptive materials which may become repeatedly wet shall be painted with two coats of aluminum metal-and-masonry paint or a coat of heavy-bodied bituminous paint. Alternate: paint the wood or other absorptive material with two coats of aluminum house paint and seal joints with a good quality calking compound.

2. ALUMINUM TO TREATED WOOD

Where aluminum is in contact with treated wood, wood shall be treated with pentachlorophenol, 5% minimum concentration, or Wolman salts or creosote or zinc naphthenate (select one). Follow the protective measures outlined in paragraph (d)1.

7. EXPANSION, CONTRACTION:

Aluminum alloys used for architectural work have a coefficient of thermal expansion of .000013 per °F per unit of length. This amounts to a change of about $\frac{1}{2}$ " per 10' of length per 100°F change in temperature.

Aluminum work shall be designed and anchored so that the work will not be distorted nor the fasteners overstressed from the expansion and contraction of the metal.

8. CONSTRUCTION PROTECTION:

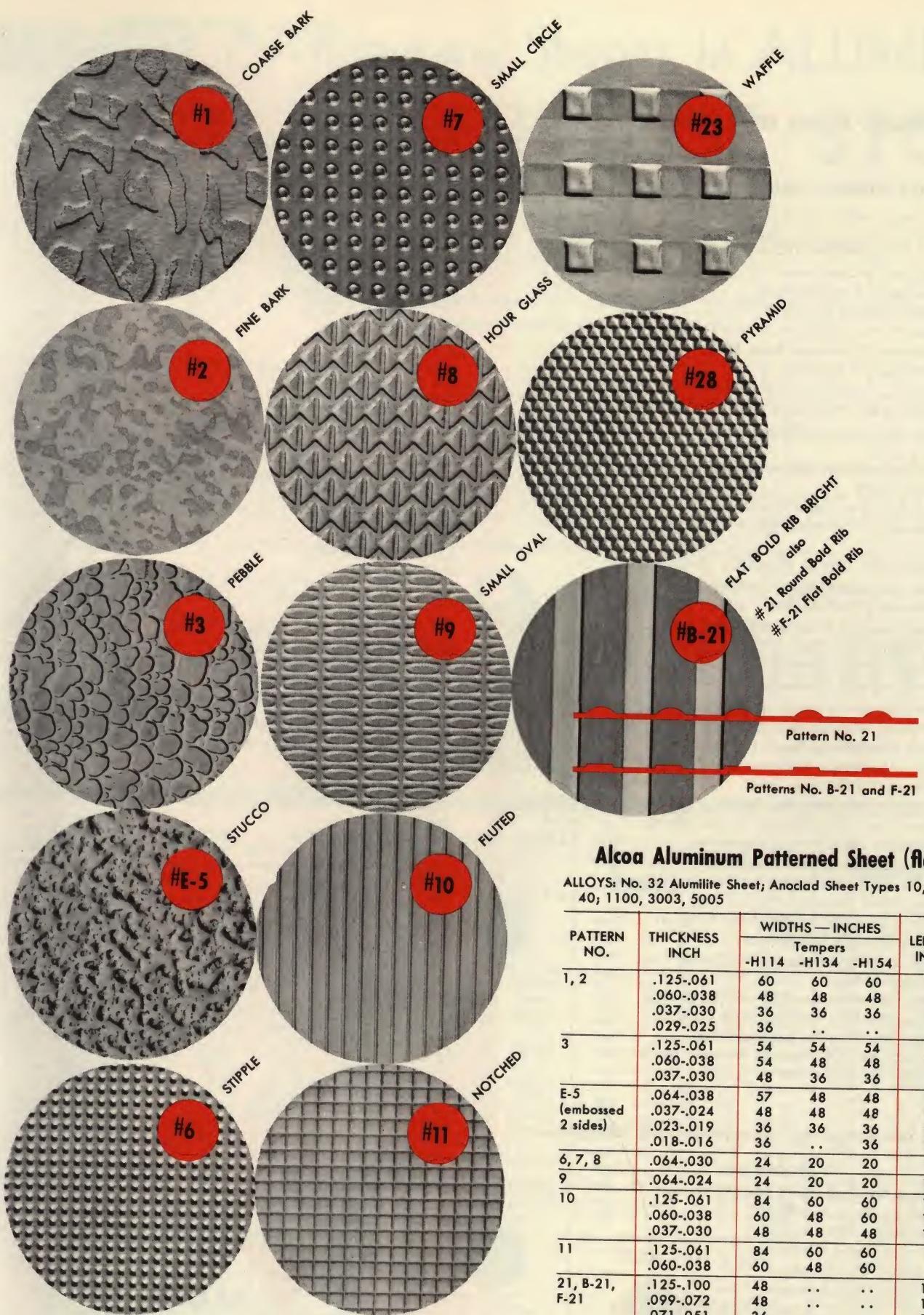
Before shipment from the factory, aluminum surfaces requiring protection should be given a coating which will protect the metal against stain, discoloration, abrasion and other construction abuses.

Aluminum surfaces requiring protection against lime mortar stains, discoloration, surface abrasion and other construction abuses shall be suitably protected in accordance with Alcoa publication, CARE DURING CONSTRUCTION, latest edition.

9. FINAL CLEANING:

After installation is completed, all aluminum work should be cleaned. This should be performed by general contractor, aluminum contractor or cleaning contractor with a recommended cleaner. Damaged parts should be replaced and installation left complete and in finished condition.

Upon completion, general contractor or aluminum contractor or cleaning contractor (select one) shall clean aluminum work in accordance with Alcoa publication, CARE DURING CONSTRUCTION, latest edition. Leave aluminum work in satisfactory condition.



Alcoa Aluminum Patterned Sheet (flat)

ALLOYS: No. 32 Alumilite Sheet; Anodized Sheet Types 10, 20, 30, 40; 1100, 3003, 5005

PATTERN NO.	THICKNESS INCH	WIDTHS — INCHES			LENGTHS INCHES
		-H114	-H134	-H154	
1, 2	.125-.061 .060-.038 .037-.030 .029-.025	60 48 36 36	60 48 36 ..	60 48 36 ..	180 180 180 180
3	.125-.061 .060-.038 .037-.030	54 54 48	54 48 36	54 48 36	180 180 180
E-5 (embossed 2 sides)	.064-.038 .037-.024 .023-.019 .018-.016	57 48 36 36	48 48 36 ..	48 48 36 36	180 180 180 144
6, 7, 8	.064-.030	24	20	20	180
9	.064-.024	24	20	20	180
10	.125-.061 .060-.038 .037-.030	84 60 48	60 48 48	60 60 48	180 180 180
11	.125-.061 .060-.038	84 60	60 48	60 60	84 72
21, B-21, F-21	.125-.100 .099-.072 .071-.051	48 48 36	180 180 180
23	.125-.100 .099-.072 .071-.051	48 48 36	72 72 72
28	.064-.038 .037-.030	18 18	18 ..	18 ..	180 180

Many patterns are available in other alloys and tempers.

ALCOA SALES OFFICES

ABERDEEN, S. D.	304 Western Union Building
AKRON 8, OHIO	506 Akron Savings & Loan Building
ALBANY 7, N. Y.	90 State Street
ALLENTOWN, PA.	1132 Hamilton Street
ATLANTA 9, GA.	Alcoa Building, 1615 Peachtree Street
BALTIMORE 2, MD.	1007 Commercial Credit Building
BIRMINGHAM 1, ALA.	No. 10 Office Park, Mountain Brook, P. O. Box 2041
BOISE, IDAHO	1220 Vista Avenue
BOSTON 16, MASS.	20 Providence Street, Park Square
BRIDGEPORT 1, CONN.	Atlantic Street
BUFFALO 5, N. Y.	P. O. Box 3024
CHARLOTTE 2, N. C.	1000 Wachovia Bank Building
CHATTANOOGA 2, TENN.	1205 Volunteer Building
CHICAGO 11, ILL.	520 North Michigan Avenue
CINCINNATI 6, OHIO	Alcoa Building, 2331 Victory Parkway
CLEVELAND 13, OHIO	1450 Terminal Tower
COLUMBUS 15, OHIO	230 Bryson Building
DALLAS 2, TEXAS	301 Thomas Building
DAVENPORT, IOWA	601 Brady Street
DAYTON 5, OHIO	207 Northtown Arcade
DENVER 6, COLO.	105 Fillmore Street
DES MOINES 12, IOWA	3620 Ingersoll Avenue
DETROIT 2, MICH.	610 New Center Building
EVANSVILLE (NEWBURGH), IND.	P. O. Box 365
FLINT 2, MICH.	510 Mott Foundation Building
FORT WAYNE, IND.	2924 South Calhoun Street Building
GARDEN CITY, N. Y.	1001 Franklin Avenue
GRAND RAPIDS 2, MICH.	812 Michigan National Bank Building
HARTFORD 3, CONN.	410 Asylum Street
HOUSTON 2, TEXAS	1310 First City National Bank Building
INDIANAPOLIS 7, IND.	2939 North Meridian Street
JACKSON, MICH.	1405 National Bank Building
KANSAS CITY 5, MO.	2300 Power & Light Building
LAFAYETTE, IND.	P. O. Box 500
LIMA, OHIO	901 National Bank Building
LITTLE ROCK, ARK.	116 Glen Drive
LOS ANGELES 17, CALIF.	1145 Wilshire Boulevard
LOUISVILLE 2, KY.	1152 Starks Building
MEMPHIS 17, TENN.	4515 Poplar Avenue
MIAMI (HIALEAH), FLA.	490 Hialeah Drive Building
MILWAUKEE 3, WIS.	2040 West Wisconsin Avenue
MINNEAPOLIS 2, MINN.	1060 Northwestern Bank Building
NASHVILLE 12, TENN.	235 Wilson-Bates Building
NEWARK 2, N. J.	744 Broad Street
NEW ORLEANS 12, LA.	1225 Whitney Building
NEW YORK 17, N. Y.	230 Park Avenue
OAKLAND 8, CALIF.	1001 46th Street
OKLAHOMA CITY 5, OKLA.	P. O. Box 3251
OMAHA 2, NEBR.	746 Omaha National Bank Building
PEORIA, ILL.	614 Commercial Bank Building
PHILADELPHIA 9, PA.	123 South Broad Street
PHOENIX, ARIZ.	625G First National Bank Building
PITTSBURGH 19, PA.	1501 Alcoa Building
PORTLAND 4, ORE.	1115 U. S. National Bank Building
PROVIDENCE 3, R. I.	2503 Industrial Bank Building
RICHMOND 19, VA.	712 Southern States Building
ROCHESTER 18, N. Y.	Erdle Building
ST. LOUIS 8, MO.	10th Floor, Continental Building
SAN DIEGO 3, CALIF.	2962 Fifth Avenue
SAN FRANCISCO 4, CALIF.	2509 Equitable Life Building
SEATTLE 1, WASH.	1411 Fourth Avenue Building
SOUTH BEND 1, IND.	805 J.M.S. Building
SPOKANE 1, WASH.	610 Fidelity Building
SPRINGFIELD 3, MASS.	508 Tarbell-Watters Building
SYRACUSE 3, N. Y.	731 James Street
TAMPA 9, FLA.	4302 Henderson Boulevard
TOLEDO 2, OHIO	350 W. Woodruff Avenue
WASHINGTON 6, D. C.	1200 Ring Building
WICHITA 2, KAN.	1010 Central Building
WILMINGTON 1, DEL.	825 Bank of Delaware Building
WORCESTER 8, MASS.	22 Pleasant Street
YORK, PA.	205 Manufacturers Building
YOUNGSTOWN 3, OHIO	537 Ohio Edison Building
ALCOA INTERNATIONAL, INC.	230 Park Avenue, New York 17, N. Y.

USEFUL ALCOA LITERATURE

for the architect, engineer and designer

Order No.	AIA File No.
ALUMINUM TECHNICAL DATA	
70-10507 Care During Construction	15-J
70-10508 Cleaning and Maintenance	13-E
03-10122 Alcoa Structural Handbook	
02-10051 Alcoa Aluminum Handbook	
31-20617 Resistance of Aluminum-Base Alloys to 20-year Atmospheric Exposure	
CURTAIN WALL PRODUCTS AND DESIGN DATA	
70-11295 Alcoa Sol-Dec Screen (Series 300-5)	35-P-2
70-11265 This is Alply Architectural Achievements (folders, detail sheets) Series 100	17-A
70-11147 Wall System of Alcoa Aluminum (Sweet's 1960 Arch. File)	17-A
ROOFING AND SIDING PRODUCT INFORMATION	
71-10285 Alcoa Aluminum Industrial Building Products (Sweet's 1960 I.C. File)	12-C
71-10528 Alcoa Aluminum Roofing and Siding Products (Sweet's 1960 Arch. File)	12-C
71-10625 Sandwich Walls of Alcoa Aluminum	
69-11171 Introducing Alcoa Alumalure	12-C
MISCELLANEOUS PRODUCT INFORMATION	
70-10448 Alcoa Architectural Stocks (1958)	15-J
70-10262 Alcoa Aluminum in Architecture (Sweet's 1960 Arch. File)	15-J
70-10427 Aluminum in Builders' Hardware	27-D
70-11261 Alcoa Pipe Railing Systems (Series 300-4)	14-D-4
71-10516 Chain Link Fence of Alcoa Aluminum	14-K
72-10300 Highway Railings of Alcoa Aluminum	
71-10529 Alcoa Aluminum Products for Industrial Building Construction (Sweet's 1960 I.C. File)	14-A
70-10306 Aluminum on the Skyline (Alcoa Building)	
31-10596 Alcoa Abrasive Tread Plate	
71-10679 New Low-Cost Aluminum Stair Treads— Grating Type	
17-10661 Alcoa Aluminum Bus Conductor Handbook	
17-10283 Alcoa Aluminum Electrical Rigid Conduit	
75-11152 Alcoa Report to the Building Industry: Facts About Aluminum in Electrical Systems	
44-10456 Finishes for Alcoa Aluminum	

of special interest to the subcontractor and fabricator

PROCESSING

01-11108 Alcoa Aluminum Alloys and Mill Products
48-10130 Forming Alcoa Aluminum
52-10031 Machining Alcoa Aluminum
50-10003 Riveting Alcoa Aluminum
30-10228 Painting With Aluminum
50-10416 Brazing Alcoa Aluminum
19-10244 Alcoa Aluminum Fasteners and Screw Machine Products



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